

# REPORT DOCUMENTATION PAGE

AFRL-SR-BL-TR-98-

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0864

AFRL-SR-BL-TR-98-0864

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE		3. REPORT TYPE AND DATES COVERED FINAL 01 Apr 97 - 31 Mar 98	
4. TITLE AND SUBTITLE durip97 CHARACTERIZATION OF NONLINEAR POLYMERS FOR HIGH-SPEED PHOTONIC RESPONSE AND NONLINEAR DISPERSION				5. FUNDING NUMBERS F49620-97-1-0284 3484/US 61103D	
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Univ of California, at Davis Dept of Electrical & Computer Engineering 1050 Engineering II Davis CA 95616-5294				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR/NL 801 North Randolph Street, Room 732 Arlington VA 22203-1977				10. SPONSORING MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION AVAILABILITY STATEMENT		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>DISTRIBUTION STATEMENT A</b>            Approved for public release;            Distribution Unlimited         </div>		12b. DISTRIBUTION CODE	
				19990114 003	
13. ABSTRACT (Maximum 200 words) High-frequency instrumentation was acquired to perform: a) high-frequency dielectric measurements on poled electro-active polymers and to determine the stability when exposed to microwave radiation, and b) electro-optic measurements of the resonant enhancement of nonlinear polymers with demonstrated photochemical stability. In particular, the equipment was used to investigate large-bandwidth, traveling wave polymeric in-line fiber (PILF) modulator that is being co-developed by UC Davis and Optovision. This PILF amplitude modulator consists of a fiber half-coupler substrate evanescently coupled to a multimode electro-optic waveguide. PILF modulators are intrinsically rugged, exhibit low third order intermodulation nonlinearity and can be produced at lower cost than fiber pigtailed modulators. The equipment consisted of a high-frequency probe station, high-frequency amplifier and signal generator, 15 GHz photodetector, low relative intensity noise fiber coupled 1330 nm laser, and a 1064 kiode pumped laser. The deviations from the original budget are that the \$30K in UC cost sharing was used towards a laser ablation accessory for the probe station (instead of the thermal evaporator), the elimination of the 1550 nm laser source and the purchase with fund remaining a high-frequency signal generator.					
14. SUBJECT TERMS				15. NUMBER OF PAGES	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT (U)		18. SECURITY CLASSIFICATION OF THIS PAGE (U)		19. SECURITY CLASSIFICATION OF ABSTRACT (U)	
				20. LIMITATION OF ABSTRACT (UL)	

**Final Report: Characterization of Nonlinear Polymers for High-speed  
Photonic Response and Nonlinear Dispersion**

André Knoesen

UC Davis

**Summary:** High-frequency instrumentation was acquired to perform: a) high-frequency dielectric measurements on poled electro-active polymers and to determine the stability when exposed to microwave radiation, and b) electro-optic measurements of the resonant enhancement of nonlinear polymers with demonstrated photochemical stability. In particular, the equipment was used to investigate large-bandwidth, traveling wave polymeric in-line fiber (PILF) modulator that is being co-developed by UC Davis and Optivision. This PILF amplitude modulator consists of a fiber half-coupler substrate evanescently coupled to a multimode electro-optic waveguide. PILF modulators are intrinsically rugged, exhibit low third order intermodulation nonlinearity and can be produced at lower cost than fiber pigtailed modulators. The equipment consisted of a high-frequency probe station, high-frequency amplifier and signal generator, 15 GHz photodetector, low relative intensity noise fiber coupled 1330 nm laser, and a 1064 diode pumped laser.

The deviations from the original budget are that the \$30K in UC cost sharing was used towards a laser ablation accessory for the probe station (instead of the thermal evaporator), the elimination of the 1550 nm laser source and the purchase with fund remaining a high-frequency signal generator.

Description	Supplier	Cost
Probe Station Package + Accessories	Cascade	\$63,979.72
Signal Generator	Hewlett Packard	\$22,745.58
Microwave Amplifier	Hewlett Packard	\$19,522.18
Infrared Laser 1319 nm	ATX Telecom	\$22,415.25
Infrared Laser 1064 nm	Coherent	\$19,330.00
Miscellaneous RF Parts	Insulated Wire	\$3,194.27
<b>Total</b>		<b>\$151,187.00</b>
<b>COST SHARING BY UC DAVIS</b>		<b>\$ 30,000.00</b>
	<b>Total</b>	<b>\$121,187.00</b>